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Evaluating Self-Efficacy as a Treatment Mechanism During an Intensive Treatment Program for Posttraumatic Stress Disorder

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Abstract

Objective: Although traumatic exposures are common, only a small percentage of people exposed to trauma go on to develop posttraumatic stress disorder (PTSD). This phenomenon suggests that there may be psychological factors that influence posttraumatic recovery trajectories. Beliefs about one's ability to cope with traumatic events have been proposed as a mechanism of posttraumatic recovery. The present study evaluated coping self-efficacy (CSE) as a treatment mechanism.

Method: Data were collected from 423 military service members and veterans who completed a 2-week cognitive processing therapy-based intensive treatment program for PTSD. Linear mixed-effects models were used to evaluate the associations between CSE and clinical symptoms over time. CSE and clinical symptoms were assessed at baseline, every other day during treatment, and at posttreatment. In addition, general self-efficacy (GSE) was assessed at baseline and included in the analyses.

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Jonathan W. Murphy was responsible for conceptualization, formal analyses, project administration, and writing of the article. Chelsea Shotwell-Tabke was responsible for writing of the article and reviewing and editing the article. Dale Smith was responsible for the methodology, formal analysis, writing the article, and reviewing and editing the article. Zerbrina Valdespino-Hayden was responsible for writing the article. Emily Patton was responsible for writing of the article. Sarah Pridgen was responsible for conceptualization and data curation. Philip Held was responsible for the conceptualization, funding acquisition, investigation, supervision, and reviewing and editing of the article. The author(s) read and approved the final article.

The data sets used in the present study are not publicly available. Data sets can be obtained from the Jonathan W. Murphy upon reasonable request. The authors have no conflicts of interest to disclose.

The study procedures were approved by the Rush University Medical Center's Institutional Review Board. A waiver of informed consent was obtained from Rush University Medical Center's Institutional Review Board as all assessments were collected as part of routine care. All research procedures followed the American Psychological Association's Ethical Principles of Psychologists and Code of Conduct and were performed in accordance with the Declaration of Helsinki.

Results: Participants reported that increases in CSE began early and steadily increased across all domains during treatment. In addition, decreases in PTSD and depression severity also began early and steadily decreased during treatment. Although improvements in CSE predicted decreases in clinical symptoms, changes in CSE did not precede clinical improvement. Baseline GSE was a significant predictor of clinical outcomes, but changes in clinical symptoms during treatment did not differ based on one's baseline GSE.

Conclusions: The present study demonstrated that although changes in CSE do not temporarily precede changes in clinical symptoms, changes in CSE predicted changes in clinical symptoms, suggesting that CSE may serve as an indicator of treatment response.

Keywords

self-efficacy; coping; posttraumatic stress disorder; cognitive processing therapy; intensive outpatient program

Estimates suggest that most people have been exposed to traumatic events in their lifetimes. For instance, a large multinational study drawing data from tens of thousands of people from over 20 countries found that more than 70% of respondents endorsed lifetime exposure to a single trauma, while over 30% reported exposure to four or more traumas (Benjet et al., 2016). However, despite a high frequency of exposure to traumatic events, only a small percentage of people exposed to trauma go on to develop posttraumatic stress disorder (PTSD; Atwoli et al., 2015; Kessler et al., 2017; Kilpatrick et al., 2013). Traumatic events involve direct or indirect exposure to perceived or actual life-threatening situations or sexual violence that may occur once or many times (Bryant, 2019; May & Wisco, 2016). Examples of traumatic events include natural or man-made disasters, combat, torture, sexual violence, terrorism, physical assault, or acute life-threatening illness (American Psychiatric Association, 2022; World Health Organization, 2022). Following exposure to a traumatic event, acute posttraumatic stress may involve intrusive and reexperiencing symptoms, cognitive and behavioral avoidance, alterations in cognition and mood, and hypervigilance and reactivity symptoms (American Psychiatric Association, 2022). For many people, these acute reactions are common and transient, but for some, acute reactions develop into PTSD. Researchers have long been interested in understanding the factors that influence individual and group differences in posttraumatic outcomes.

Nearly half a century ago, Bandura (1977) proposed that self-appraisals of efficacy function as a cognitive determinant of behavior. His proposition was part of an expanding literature integrating cognitive processes into psychological models of stress and coping. Per Bandura, these self-appraisals were a potent cognitive factor that precipitated behavioral responses across individual-situation interactions (Bandura, 1982). From this position, he argued that perceived self-efficacy regulates behavioral responses to a wide range of environmental conditions, including traumatic events (Benight & Bandura, 2004). After a traumatic exposure, self-efficacy beliefs may determine how someone responds to the demands of the posttraumatic environment. For some, self-efficacy beliefs enhance one's confidence that they have the capacity to cope with posttraumatic stress, leading to resilience and recovery. However, others appraise their capacity to cope as poor, leading to unhelpful, avoidant

coping strategies that may lead to the development and maintenance of PTSD (Benight & Bandura, 2004).

Drawing from this framework, two lines of research have emerged investigating the relationship between self-efficacy and posttraumatic stress outcomes, one focused on general self-efficacy (GSE) and the other focused on trauma-specific coping self-efficacy (CSE; Benight et al., 2015). GSE refers to global, context-nonspecific self-appraisals of one's capacity to manage routine and unusual stressors alike and is conceptualized as an enduring, traitlike construct (Chen et al., 2001). Bandura (2018) cautioned against the use of all-purpose, unitary measures of self-efficacy, noting that it may be disconnected from relevant domains of functioning or unique situation-specific demands. To address the context-nonspecific limitations of GSE, researchers have begun to assess CSE to examine individuals' perceived self-efficacy in the context of traumatic reactions (Benight et al., 2000; Chesney et al., 2006).

Over the last few decades, both general and trauma-specific CSE have received empirical attention, though rarely simultaneously. In a meta-analysis investigating the predictive capacity of self-efficacy, Gallagher et al. (2020) analyzed data from prospective, nontreatment studies with both cross-sectional and longitudinal designs. The authors reported overall support for GSE and CSE as predictors of posttraumatic outcomes with higher GSE and CSE showing an inverse relationship with PTSD symptomatology in both types of designs (Gallagher et al., 2020). For CSE, this relationship tended to be stronger, with CSE showing larger weighted mean effect sizes relative to GSE in both cross-sectional (CSE: −.49 vs. GSE: −.25) and longitudinal (CSE: −.52 vs. GSE: −.26) studies (Gallagher et al., 2020). In one notable nontreatment study, Bosmans and van der Velden (2015) reported that CSE predicted subsequent PTSD symptomatology, but not the other way around, suggesting that CSE may serve as a protective factor. In a later nontreatment study, the same authors reported that persistent PTSD symptoms were associated with lower CSE over time, suggesting that persistent PTSD symptoms may erode CSE (Bosmans & van der Velden, 2017).

To date, the literature examining the relationship between changes in CSE and PTSD in the context of trauma-focused treatments is quite limited. Bosmans et al. (2016) evaluated the relationship between baseline CSE and PTSD symptoms at 8-month follow-up for trauma-exposed participants engaged in one of two evidence-based treatments (EBTs; cognitive processing therapy [CPT], or eye movement desensitization reprocessing). In the control group, baseline CSE predicted PTSD symptoms at follow-up such that lower baseline CSE predicted less change in PTSD symptoms at follow-up. For the active treatment group, although PTSD symptoms decreased from baseline to follow-up, baseline CSE did not predict PTSD symptoms at follow-up (Bosmans et al., 2016). The authors concluded that CSE may be a helpful indicator of PTSD recovery for nontreatment-seeking individuals, but CSE loses its predictive value once someone engages in treatment. However, the study design included only two time points spread across 8 months, limiting the authors' ability to evaluate a temporal relationship between CSE and symptoms during treatment. In another study, Shoji et al. (2021) examined the relationships between CSE, PTSD symptoms, and social functioning in a community sample of trauma survivors engaged in treatment with

assessments at baseline, 3 months, and 6 months into treatment. The authors reported that CSE did not predict PTSD symptoms or perceived social functioning, suggesting that CSE may not be a mechanism of change in symptomatology or functioning during treatment (Shoji et al., 2021). However, the authors acknowledged several limitations, including that only a small number of participants received EBTs, over half of the participants (57%) dropped out of treatment before the 3-month assessment, and under one third of participants who started treatment completed treatment/assessment at 6 months. Furthermore, the authors noted that the infrequency of assessment likely impacted their findings, suggesting that future research should collect data more frequently.

Treatment research exploring the relationship between GSE and PTSD symptomatology has also been limited. In one study, Cusack et al. (2019) investigated the relationship between changes in GSE and PTSD during a 10-session, group-based PTSD treatment for military veterans. Although the authors found that GSE changed from baseline to posttreatment, they reported that baseline GSE was not associated with changes in PTSD symptoms at the end of treatment. In the only other treatment study involving GSE, Cyniak-Cieciura et al. (2015) examined negative posttraumatic cognitions as a mediator between the relationship between changes in GSE and PTSD symptoms as part of a randomized clinical trial with three arms, including prolonged exposure, pharmacotherapy, and combined treatment (see Popiel et al., 2015, for details). This study analyzed data collected at baseline and 1-year follow-up after treatment. Notably, no posttreatment data were included in the analyses. Among their findings, the authors reported that baseline GSE was not correlated with PTSD symptoms at 1-year follow-up. However, this study suffered from many limitations, including no posttreatment assessment and the use of 1-year follow-up data as a proxy for posttreatment. In sum, these studies suggest that baseline GSE (like CSE) does not predict treatment outcomes. However, these studies have not evaluated the effect that baseline GSE might have on changes in CSE and the relationship between these changes and PTSD symptoms during treatment.

When taken together, there are several notable limitations in the existing research investigating the relationship between self-efficacy and PTSD symptomatology in the context of treatment. To date, researchers have examined this relationship in treatment studies that involve more than one EBT pooled together into one combined treatment group (Bosmans et al., 2016; Cyniak-Cieciura et al., 2015) or a mixture of EBTs and non-EBTs (Shoji et al., 2021). In addition, the extant studies used pre- to posttreatment analyses rather than repeated measures analyses (Bosmans et al., 2016; Cusack et al., 2019), suffered from marked dropout during treatment (Shoji et al., 2021), and/or assessed self-efficacy and PTSD symptoms across long periods (e.g., 8 months in Bosmans et al., 2016; 1-year follow-up in Cyniak-Cieciura et al., 2015; 3- and 6-month assessments in Shoji et al., 2021). Finally, few studies have examined the role of self-efficacy in the treatment of PTSD in military service members and/or veterans. Given these limitations, additional research is needed to clarify the relationship between self-efficacy and PTSD symptoms during treatment.

Given the impact treatment dropout has had on prior research in this area, the intensive or massed treatment format may provide a viable option to study the impact of self-efficacy

on treatment outcomes. Over the last decade, intensive treatments for PTSD have been established as a viable format that accelerates the pace of EBTs without degrading the efficacy of treatments (Wright et al., 2023). In this format, EBTs are concentrated and delivered in a shorter period, typically at least three sessions per week in less than 4 weeks (Held et al., 2019). Furthermore, intensively delivered EBTs may be offered as stand-alone treatments or embedded within intensive treatment programs (ITPs; Peterson et al., 2023; Ragsdale et al., 2020). Relative to the standard tempo, intensive treatments have consistently yielded accelerated symptom reduction and dropout rates that are generally less than 10% (Ragsdale et al., 2020; Sciarrino et al., 2020). Notably, accelerated EBTs have yielded reductions in PTSD symptoms as well as other highly comorbid symptoms, including depressive symptoms, suicidal ideation, and substance use (Held et al., 2019, 2023; Post et al., 2021; Watkins et al., 2024).

The present study addresses significant gaps in the clinical literature using a CPT-based ITP to evaluate the relationship between changes in self-efficacy and PTSD during treatment. Based on prior research, we tested three hypotheses. First, we predicted that CSE in domain-specific areas of functioning would increase during treatment based on preliminary evidence that CSE increases during treatment (Shoji et al., 2021). However, the present study was the first to evaluate change in CSE during an intensive or massed format. Currently, it is unclear if CSE can change within 2 weeks of treatment. Second, we hypothesized that CSE would function as a mechanism of change during treatment, such that improvements in CSE would precede and predict changes in PTSD symptomatology. Notably, no published studies appear to have investigated CSE as a mechanism of change for military service members and/or veterans. Finally, to date, no treatment studies have investigated baseline GSE and CSE simultaneously or the impact of baseline GSE on changes in PTSD symptoms during treatment. Thus, we tested an exploratory hypothesis aimed at investigating baseline GSE in the context of treatment. Drawing from the limited empirical literature, we predicted that baseline GSE will not predict changes in PTSD symptoms during treatment (Bandura, 2018; Cusack et al., 2019; Cyniak-Cieciura et al., 2015). Together, these hypotheses aimed to provide more clarity in the PTSD treatment literature on the relationship between the two conceptualizations of self-efficacy (GSE and CSE) and PTSD symptoms.

Method

Participants

Data were collected from 426 military service members and/or veterans who completed a 2-week CPT-based ITP for PTSD from June 2020 to July 2023. This ITP is currently hosted at the Road Home Program at Rush University Medical Center in Chicago, Illinois, where it has operated since 2016. If admitted to the program, participants are divided into coed cohorts based on their index event type (combat trauma or military sexual trauma cohorts). Out of the total sample, three participants were not included in the analyses because they only completed one of five assessments during treatment. Thus, the final sample included 423 participants. In the final sample, participants were on average 44.11 years old (SD = 10.33), and the majority identified as male (54.46%), non-Hispanic (81.69%), and White

(69.23%). Additional sample characteristics are presented in Table 1. Of the 423 participants included in the analyses, 399 completed treatment (95.68%).

Materials

Demographics: At program intake, participants provided data on the following demographic characteristics: age, sex, race/ethnicity, military service period, branch of service, number of combat deployments, and whether they served before or after the terrorist attacks on September 11, 2001 (for details, see Table 1).

Patient-Reported Outcomes Measurement Information System: The Patient-Reported Outcomes Measurement Information System (PROMIS) is a large bank of self-report items and surveys, measuring components of physical, mental, and social health (Cella et al., 2010). In this study, CSE was measured using items selected from the PROMIS Self-Efficacy for Managing Symptoms Version 1.0 item bank, which measures one's confidence in their ability to effectively manage chronic conditions across various life domains. The PROMIS Self-Efficacy for Managing Symptoms has demonstrated excellent internal consistency and concurrent validity when evaluated as the full 28-item bank and for both the four- and eight-item short forms (Gruber-Baldini et al., 2017). In this study, five items were selected from the eight-item short form that assessed CSE across several domains relevant to managing PTSD symptoms, including daily activities, relationships with friends and family, public places, at home, and at work. We decided against assessing items that asked about individuals' perceived ability to work on their symptoms with their doctor and how to find information about managing their symptoms to reduce the assessment burden and because these items did not appear to apply well given that all individuals were receiving treatment for their symptoms. Each item is rated on a 5-point Likert scale ranging from 0 (*I am not at all confident*) to 4 (*I am very confident*). The PROMIS Self-efficacy for Managing Symptoms items were administered at beginning of the day on the following days of programming: 1 (baseline), 3, 5, 6, 8, and 10 (posttreatment). Per the PROMIS guidelines, these items were not combined into a new, unvalidated short form (HealthMeasures, 2023). Instead, each item was analyzed as a single measure of CSE, based on previous research showing that single-item measures of self-efficacy can perform equivalently to multi-item scales (Hoeppner et al., 2011).

General Self-Efficacy Scale: The General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) is a 10-item measure of one's perceived capacity to manage stress in a variety of stressful situations. Participant ratings range from 0 (*not true at all*) to 3 (*exactly true*) on each item. Total scores range from 0 to 30, with higher scores indicating high confidence in one's ability to cope with stress. It has demonstrated consistent reliability and validity as a stand-alone scale (Luszczynska et al., 2005) and within the PROMIS bank (Kupst et al., 2015). In this study, the General Self-Efficacy Scale was only collected at baseline, and its Cronbach's α was .92.

Patient Health Questionnaire–9: The Patient Health Questionnaire–9 (PHQ-9; Kroenke et al., 2001) was used to assess symptoms of depression over the past 2 weeks. The PHQ-9 contains nine self-report items based on *Diagnostic and Statistical Manual of Mental*

Disorders, fourth edition, criteria, with a scale ranging from 0 (*not at all*) to 3 (*nearly every day*). Total scores range from 0 to 27, with higher scores indicating greater depression severity. The PHQ-9 was administered before programming started on the following days: 1 (baseline), 3, 5, 6, 8, and 10 (posttreatment). Cronbach's α in the present study ranged from .85 to .88.

PTSD Checklist for Diagnostic and Statistical Manual, Fifth Edition: The PTSD Checklist for *Diagnostic and Statistical Manual, fifth edition* (PCL-5; Weathers et al., 2013) was used to assess symptoms of PTSD within the last month at baseline. The PCL-5 is a self-report measure with 20 items corresponding to the *Diagnostic and Statistical Manual, fifth* edition, diagnostic criteria for PTSD. Participants reported on symptoms in the past month in reference to a Criterion A trauma. The rating scale for each item is 0 (*not at all*) to 4 (*extremely*) with total scores ranging from 0 to 80 and higher scores suggesting greater symptom severity. During the 2-week ITP, the PCL-5 was collected prior to any treatment on the following days: 1 (baseline), 3, 5, 6, 8, and 10 (posttreatment). Cronbach's α in the present study ranged from .92 to .96.

Procedure

The 2-week ITP for PTSD consisted of two individual CPT sessions daily, each followed by dedicated time (60 min) to complete assigned CPT homework (for detailed description, see Held et al., 2023). Participation in the 2-week ITP resulted in a total of 16 sessions of CPT, as well as supplementary group-based clinical activities (psychoeducation, mindfulness, art therapy, CPT and dialectal behavioral therapy skills, and case management services). Furthermore, acupuncture and consultation with physicians for medical and neuropsychological concerns were offered as an optional component. Participants also had the opportunity to receive up to six brief individual sessions focused on increasing support and coping for various areas of need, such as difficulties with emotion and communication, substance use, and spirituality.

Data Analytic Plan

Overall changes in CSE, PCL-5, and PHQ-9 were initially assessed via effect sizes for change during the program. We explored the size and timing of changes for CSE and clinical symptoms by comparing the standardized amount of change that occurred following baseline in these measures using standardized mean gain scores (*ESsg*; Lipsey & Wilson, 2001). This method has been previously utilized in studies examining the timing of changes and possible temporal precedence in PTSD research (Held et al., 2022; Lee et al., 2021).

Linear mixed-effects models were utilized to explore the associations between CSE and clinical symptoms over time. Each of the domain-specific CSE items was included as time-varying covariates in adjusted linear mixed-effects models predicting either PTSD or depression symptoms across program time points. Models also included baseline GSE and controlled for sex, age, race, ethnicity, marital status, cohort type (combat or military sexual trauma), and service era (pre- or post-9/11). CSE items were explored in the same model due to interest in assessing the contribution of each to predicting program outcomes beyond the variance in outcomes accounted for by the others. The interaction between GSE and time

was also examined to assess whether baseline GSE was associated with differential change in program outcomes over time.

CSE items that were significant in this combined adjusted model were explored in separate adjusted models adjusting for the same variables except for the other CSE items. This was done to assess whether both within-subjects changes, rather than simply between-subject differences, in self-efficacy-predicted outcomes. For this study, within-subject changes reflect the extent to which changes in CSE within a participant are associated with changes in PTSD or depression symptoms, which was of particular interest here. This was done by partitioning between- and within-subjects effects of each CSE score and entering each into the linear mixed-effects model. Analyses were conducted in Stata Version 17 and R Version 4.3.2, and figures were created in R.

Results

Improvements in PTSD symptom severity were large with PCL-5 scores decreasing by 21.43 points on average (SD = 18.40; $ESsg$ = 1.16). Similarly, depressive symptom improvement during the program was also large, with an average improvement on the PHQ-9 of 5.46 (SD = 5.37, $ESsg$ = 0.96). CSE changes during the program were moderate to large for all measures (see Table 2). Changes in CSE appeared to follow the same temporal trend as PTSD and depressive symptoms, beginning early in treatment and continuing fairly steadily until treatment completion. Given these similar trends, temporal precedence could not be supported by these data (see Figure 1).

Linear mixed-effects models suggested that confidence in managing symptoms in public (p < .001), during daily activities (p < .001), in relationships (p < .001), and at work (p < .001), was a significant predictor of PTSD change over time, but not managing symptoms at home (see Table 2). All five CSE items were significant predictors of depression change during the program ($ESsgs$ between 0.57 and 0.98; see Table 2). Improvements in these CSE items were associated with reductions in PTSD and depression severity during the program (see Table 3). During treatment, participants who identified as Hispanic/Latinx generally experienced significantly greater severity in PTSD and depression symptoms relative to those who did not identify as Hispanic/Latinx. For depressive symptoms, identifying as a non-White ethnicity was also generally associated with greater symptom severity relative to those who identified as White. In addition, on average, participants in military sexual trauma cohorts endorsed significantly higher PTSD and depressive symptoms over time relative to those in combat cohorts. No other demographic variables were significant (see Table 3).

Baseline GSE (M = 15.12, SD = 6.02) was a significant predictor of PTSD (p < .001) and depression (p < .001) symptoms, indicating that those with higher GSE at baseline had generally lower PTSD and depression over time. The interaction between baseline GSE and time was not significant for either PTSD (p = .888) or depression (p = .479) symptoms, suggesting that time trends for clinical symptoms during the program do not differ based on baseline GSE (see Table 3). Within-subjects changes in all CSE items that were significant in the adjusted models were significant predictors of changes in PTSD and depression symptoms over time, indicating that within-subject improvements in four domains of CSE

were associated with improvement in PTSD and depression symptomatology during the program (all *p*s < .001).[1]

Discussion

The purpose of this study was to address major limitations in the existing literature regarding the role of self-efficacy during treatment for PTSD. In this study, we evaluated the relationship between CSE and clinical outcomes during a 2-week CPT-based ITP. Results supported our first hypothesis that domain-specific functional areas of CSE improved during treatment. During the 2-week ITP, participants reported increased confidence in their capacity to manage their PTSD symptoms across all domains measured, including daily activities, relationships, public places, at home, and at work. Although CPT was embedded within an ITP, these findings support the notion that completion of a psychological intervention can improve one's beliefs about their ability to cope with posttraumatic stress in different areas of life (Benight & Bandura, 2004). Furthermore, these results suggest that CSE can change during an intensive treatment for PTSD, which had not been previously established in the existing research.

Our second hypothesis posited that CSE serves as a mechanism of change during treatment. Our results showed that changes in CSE did not temporally precede changes in PTSD symptoms during treatment. We found that CSE and PTSD symptom levels changed simultaneously, such that participants with increasing CSE were also experiencing parallel improvements in PTSD symptoms across time. This pattern of concurrent change was also observed for depressive symptoms. Although temporal precedence was not observed, our results showed changes in CSE predicted changes in PTSD symptoms, suggesting that CSE may be an indicator of treatment response. Increased CSE was associated with later improvements in PTSD symptoms in all five domains but one, managing symptoms at home. To participate in this in-person ITP, all participants were required to travel from their homes and stay in designated lodging. Thus, this physical disconnection from their home environment may have impacted participants' ability to provide meaningful CSE ratings in this domain. Our findings suggest that confidence in managing one's symptoms at home may be less responsive in a treatment setting that is geographically separated from one's home.

For depressive symptoms, increased CSE was associated with decreases in depressive symptomatology across all the functional domains. Like PTSD symptoms, increased confidence in one's ability to manage chronic symptoms may serve as an indicator of later improvements in depressive symptoms. Unlike PTSD symptoms, confidence in one's ability to manage symptoms at home appears to be more amenable to change even when one is removed from their home environment. Although PTSD and depression are highly comorbid, research has consistently found an empirical distinction between these syndromes, identifying both overlapping and nonoverlapping symptoms (Afzali et al., 2017; Held et al., 2022; Stander et al., 2014). Our finding that PTSD and depressive symptoms

[1]Comorbid PTSD and major depression have been associated with dampened response to psychological treatments for PTSD (Barawi et al., 2020). However, when the model predicting PCL-5 (Table 3) was adjusted for baseline PHQ-9, it did not differ any meaningful way, suggesting that elevated depressive symptoms (an estimate for probable major depression) did not dampen treatment response.

responded slightly differently to treatment is consistent with the notion that these syndromes are related but distinct.

Consistent with previous studies, our findings do not provide clear evidence that CSE serves as a mechanism of change. However, they suggest that changes in CSE may serve as an indicator of treatment response during treatment (i.e., if someone is experiencing increased CSE, they are likely to experience improvements in PTSD and depressive symptoms). Clinicians may find it helpful to identify CSE with patients as a response indicator. Tracking CSE during treatment may be helpful in shaping patients' treatment outcome expectations, which has been associated with posttreatment improvements (Constantino et al., 2018; Cuijpers et al., 2019; Wampold, 2015). In addition, our results offer a clearer picture of the temporal relationship between CSE and clinical symptomatology during treatment. To date, the extant research suggests that CSE may only be a helpful indicator of posttraumatic recovery for those not engaged in treatment (Bosmans et al., 2016). Our findings challenge this conclusion, asserting that CSE may also be a helpful indicator of recovery during treatment.

Finally, the present study evaluated the effect of baseline GSE on clinical outcomes. Baseline GSE was associated with overall changes in both PTSD and depressive symptoms, such that higher baseline GSE was associated with lower symptomatology during and after treatment. This finding contrasts with the only other study examining this relationship, which reported that baseline GSE was not associated with treatment outcomes (Cusack et al., 2019). In addition, we found that baseline GSE was not associated with different trajectories of change for participants during treatment. Importantly, this finding suggests baseline level of GSE does not determine treatment response (i.e., low baseline GSE does not preclude one from the benefits of treatment with respect to improvements in PTSD and depressive symptoms). Finally, the inclusion of baseline GSE in the model did not extinguish the effects of CSE, which has notably larger effects than baseline GSE for both PTSD and depressive symptoms. When taken together, these findings suggest that baseline GSE may serve as a protective factor during posttraumatic recovery (as conceptualized), but it does not preordain treatment outcomes.

The aim of this study was to address the limitations of the existing clinical research that has investigated the role of self-efficacy in treatments for PTSD. Prior to this study, the existing literature had generally suggested that both CSE and GSE were unrelated to clinical outcomes and, thus, not part of the change process during treatments for PTSD. Contrary to these findings, the present study found that CSE and GSE may be relevant after all, supporting components of the theory first proposed by Bandura (1977). Although our results do not support Bandura's notion of self-efficacy as a mechanism, these findings contribute to a broader literature investigating cognitive mechanisms of clinical change during treatments for PTSD.

When compared with previous studies, the present study had several strengths. Foremost, it was the first treatment study of CSE to include temporal precedence as part of the evaluation of mediation. The existing treatment studies investigating CSE did not include temporal precedence in their analyses, which has become widely recognized as a critical weakness

in treatment research (Alpert et al., 2023; Kazdin, 2007; Kendall et al., 2017; Stuart et al., 2021). In addition, this study is the first study to analyze CSE and GSE simultaneously during treatment. By doing this, we were able to differentiate the effects of these similar but distinct variables. Furthermore, this study is the first study to investigate self-efficacy in the context of an ITP for PTSD. In this format, dropout was low (4.32%) compared with the two previous studies of CSE delivered in a standard, weekly format (47% and 57%, Bosmans et al., 2016; Shoji et al., 2021, respectively). Next, this study was the first to investigate CSE as a mechanism of change during treatment for military service members and/or veterans. Finally, this study involved only one EBT (CPT) rather than a nonrandomized mixture of treatments as seen in previous studies of self-efficacy (CPT and eye movement desensitization reprocessing in Bosmans et al., 2016; EBTs and non-EBTs in Shoji et al., 2021).

Despite its many strengths, there are several limitations of this study that must be considered when interpreting the results. First, the current sample was limited to military service members and veterans with PTSD seeking treatment via an ITP, which limits the study's generalizability to other populations and treatment settings. Future studies should replicate this design including nonmilitary participants. Second, the CPT-based ITP included several adjunctive services (e.g., mindfulness, psychoeducation). Thus, it cannot be conclusively determined that individual delivery of CPT was the primary component of the program that led to increases in CSE. It is possible that some other components of the program had a larger effect on CSE. In the future, researchers should replicate this study using massed stand-alone EBTs, which have garnered empirical support suggesting noninferiority to ITPs (e.g., see Dell et al., 2023; Foa et al., 2018; Peterson et al., 2023). Third, each domain of CSE was measured using one item, which has several psychometric limitations, including the lack of an internal consistency statistic and limited scope to describe complex, multidimensional human phenomenon (Wanous et al., 1997). However, there have been several studies that have identified strategies to validate single-item measures (Allen et al., 2022). In one treatment study, single- and multi-item measures of self-efficacy were compared in a sample of residential treatment for substance use with results suggesting that single-item measures can be as valid and reliable as multi-item measures (Hoeppner et al., 2011). For future research, investigators should compare single- and multi-item measures in a treatment sample receiving intensive outpatient treatments for PTSD. Fourth, the present study was a nonrandomized treatment study that did not include a control condition. Therefore, systematic biases in our sample may have impacted the results. Future studies should include randomized assignment to treatment or control conditions, which may help isolate treatment effects. Finally, clinical symptoms and CSE were assessed relatively infrequently, given the high frequency of treatment delivery. In the ITP, the assessment was conducted every other day, during which participants may have completed four individual sessions of CPT. The present study may not have assessed these variables at an adequate frequency to detect the temporal precedence of CSE. In future studies, researchers should consider a rate of assessment that matches the rate of treatment in ITPs.

Despite these limitations, the present study enhances our understanding of the role self-efficacy plays in the treatment of PTSD. Utilizing an ITP allowed for more robust modeling of the change process during treatment as compared with the extant literature. Although our

results did not support self-efficacy as a treatment mechanism, this study provided a more robust test of Bandura's theory of CSE than has been previously conducted in the context of PTSD treatment. The findings contribute to a growing understanding of the role that cognition plays in the posttraumatic recovery process.

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Clinical Impact Statement

This study enhances our understanding of the role self-efficacy plays in the treatment of posttraumatic stress disorder. Although the results did not support self-efficacy as a treatment mechanism, they suggest that changes in self-efficacy may indicate treatment response. These findings contribute to a growing understanding of the role that cognition plays in the posttraumatic recovery process.

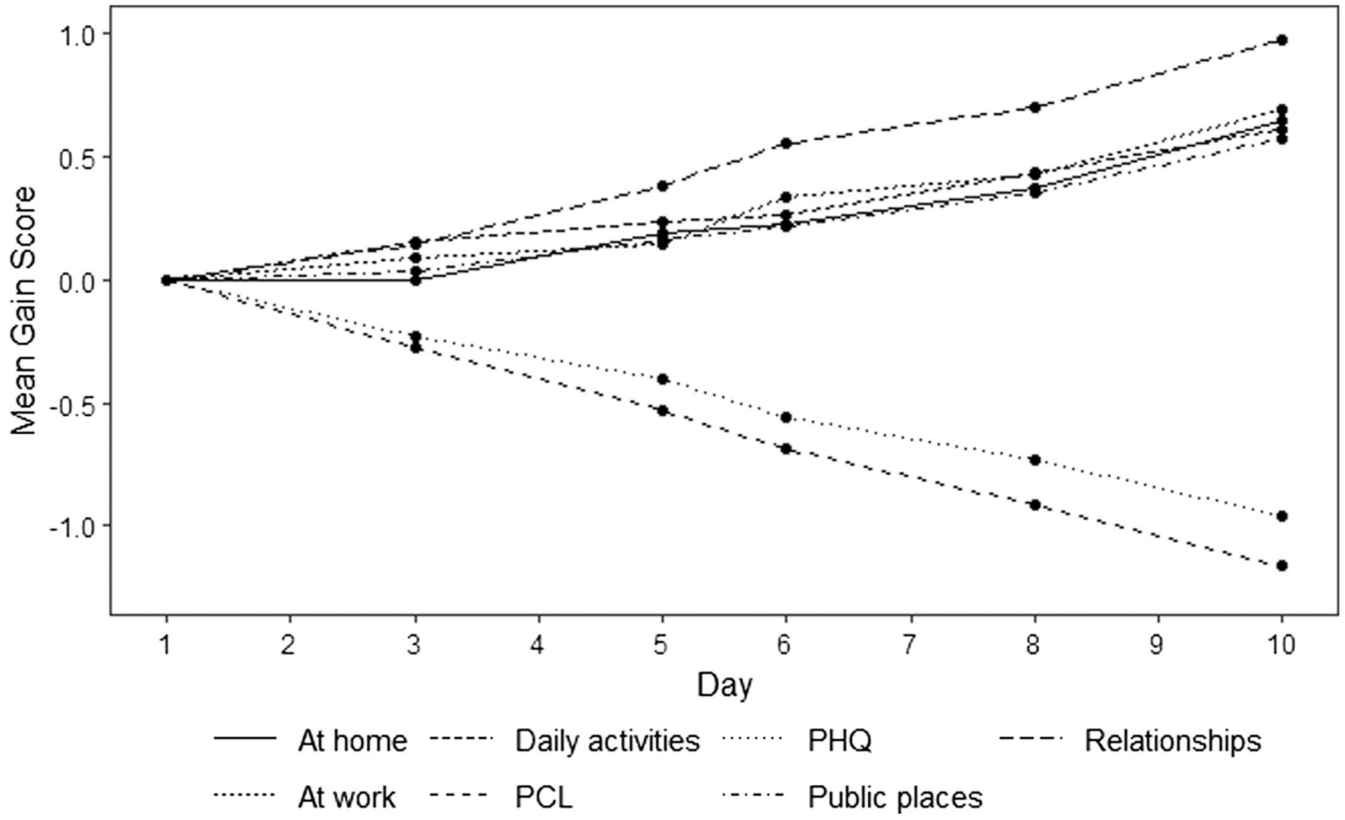

Figure 1. Trajectories of Variable Change Over Time

Note. PHQ = Patient Health Questionnaire; PCL = Posttraumatic Stress Disorder Checklist.

Table 1

Demographic Characteristics of Sample

Characteristic	*n*	%
Sex		
Male	232	54.46
Female	194	45.54
Ethnicity		
Not Hispanic	348	81.69
Race		
Native American/Alaskan	2	0.47
Asian	16	3.76
Black or African American	98	23.00
Native Hawaiian or Pacific Islander	4	0.94
White	270	63.38
Other	36	8.45
Marital status		
Married	217	50.94
Single	112	26.29
Divorced	78	18.31
Separated	14	03.29
Widowed	3	0.70
Other	2	0.47
Military service branch		
Air Force	56	13.15
Army	240	56.34
Coast Guard	2	0.47
Marines	56	13.15
Navy	72	16.9
Service era		
After September 11, 2001	345	80.99
Highest rank in service		
E-1 to E-4	165	38.73
E-5 to E-6	163	38.26
E-7 to E-9	51	11.97
O-1 to O-3	23	5.40
O-4 to O-6	16	3.76
WO-1 to WO-5	5	1.17
Not reported	3	0.70
Deployed		
Yes	295	69.25
Cohort		
Combat	237	55.64
MST	189	44.36

Characteristic	*n*	%
Baseline symptom severity	***M***	***SD***
Baseline PCL-5	54.52	14.12
Baseline PHQ-9	16.72	5.66

Note. *N* = 426. E = enlisted rank; MST = military sexual trauma; O = officer rank; PCL-5 = Posttraumatic Stress Disorder Checklist for *Diagnostic and Statistical Manual of Mental Disorders, fifth edition*; PHQ-9 = Patient Health Questionnaire–9; WO = warrant officer.

Table 2

Changes in CSE During Treatment

CSE variable domain	Pretreatment		Posttreatment		*ESsg*
	M	*SD*	*M*	*SD*	
At home	2.51	1.02	3.17	1.02	0.65
Public places	2.57	1.03	3.16	1.04	0.57
Daily activities	2.55	0.91	3.12	0.95	0.61
Relationships	1.89	0.90	2.84	1.03	0.98
At work	2.13	0.95	2.86	1.15	0.69

Note. CSE = coping self-efficacy; *ESsg* = standardized mean gain scores.

Table 3

Results of Linear Mixed-Effects Modeling

Variable	PCL-5		PHQ-9	
	b [95% CI]	p	*b* [95% CI]	p
Time	−1.79 [−1.96, −1.62]	<.001	−0.50 [−0.55, −0.44]	<.001
CSE (at home)	−0.53 [1.08, 0.02]	.057	−0.23 [−0.42, −0.04]	.020*
CSE (public places)	−1.67 [−2.24, −1.10]	<.001*	−0.22 [−0.41, −0.01]	.036*
CSE (daily activities)	−0.81 [−1.41, −0.20]	<.001*	−0.29 [−0.50, −0.07]	.008*
CSE (relationships)	−1.20 [−1.81, −0.60]	<.001*	−0.39 [−0.60, −0.18]	<.001*
CSE (at work)	−1.23 [−1.80, −0.66]	<.001*	−0.60 [−0.80, −0.40]	<.001*
GSE	−0.63 [−0.82, −0.44]	<.001	−0.22 [−0.29, −0.15]	<.001
GSE × Time Interaction	−0.002 [−0.03, 0.02]	.888	0.003 [−0.01, 0.01]	.479
Sex[a]	−2.42 [−6.00, 1.15]	.184	−1.57 [−2.92, −0.22]	.022
Race	−0.66 [−3.03, 1.72]	.586	−1.15 [−2.04, −0.25]	.012
Ethnicity	4.87 [1.97, 7,78]	.001	1.86 [0.77, 2.95]	.001
Marital status	0.42 [−1.91, 2.76]	.723	−0.06 [−0.94, 0.82]	.896
Number of deployments	−0.03 [−0.56, 0.49]	.907	−0.10 [−0.30, 0.10]	.322
Cohort type	4.37 [0.74, 8.00]	.018	1.99 [0.62, 3.36]	.004
Service after September 11, 2001	−1.89 [−4.85, 1.06]	.209	0.09 [−1.02, 1.20]	.873

Note. PCL-5 = Posttraumatic Stress *Disorder Checklist for Diagnostic and Statistical Manual of Mental Disorders, fifth edition*; PHQ-9 = Patient Health Questionnaire–9; CI = confidence interval; CSE = coping self-efficacy; GSE = general self-efficacy.

[a]Reference categories were male, White, non-Hispanic, married, and combat cohorts.

*Within-subjects component was significant ($p < .001$).